coincides with those seen after section of the posterior columns. They are explained by want of tactile sensibility. If these centres are extirpated more deeply, then there is a want of all sensibility. The peculiarities seen after extirpation of the centres are due to want of tactile sensibility, for the tactile sensations of the different organs have cerebral centres, which are yet active when all peripheral-entering nerves of tactile conductivity are paralyzed. The centre of vision is active when both of the nerves are paralyzed, through substitution-action with other centres. The degeneration of the pyramido-lateral paths is due to affections of motor centres. The view of motor centres is superfluous; the movements are reflex.

His supposition is: that the posterior columns and Türck's columns are mainly of the same system; the pyramido-lateral paths are not otherwise than the descending angle of a reflex arc, through which the position of our limbs or changes in our equilibrium are regulated. After division of Türck's columns the movements do not take place after irritation of Hitzig's centres. The position of the tactile centre is not in the cortex. In the spinal ganglia lie the trophic centres for the ascending line of the cerebral tactile arc.—*Pflüger's Archiv*, xxviii, 1882; xxix, 1882; xxx, 1883.

THE IRRITABILITY OF THE ANTERIOR COLUMNS OF THE SPINAL CORD.—Herr Mendelssohn has made experiments upon this subject in the laboratories of Marey at Paris and Rosenthal at Erlangen. He used a myograph to register the contraction of the muscle. His method of experimenting was as follows: The cerebrum was divided in order to exclude voluntary movements, the gastrocnemius of the left side prepared, the spinal cord in its whole length laid bare, the brachial plexus on both sides divided, the spinal cord lifted out of the vertebral canal, and its anterior part placed on plates of rubber. Then the gastrocnemius was attached to the lever, and the electrodes laid on the anterior part of the spinal cord, near the place where the brachial plexus is given off. The distance of this place from the roots of the nerves for the lower extremities is so far that a possibility of the spreading of the currents to the posterior roots is lessened and excluded. To test the spreading of the currents he used the telephone, which is preferable to the nerve-muscle preparation for the detection of weak currents. From all his experiments he found that the reaction of the anterior columns is shorter than the reaction-time of the posterior columns of the spinal cord; that is, irritation of the anterior segment of the spinal cord generates a movement of the extremities quicker than when the same irritation acts on the corresponding place of the posterior part. The movement generated from the posterior columns is a reflex movement, whilst that generated in the anterior columns is a direct excitation. The difference between the times of reaction was from .01 to .025

seconds, which is the time required for transverse conduction of the spinal cord, which has been determined by Prof. Rosenthal.—*DuBois' Archiv*, 1883, Heft 2 and 3.

The Innervation of the Cardiac End of the Stomach.—Dr. Openchowski has made a series of experiments upon this point. His results are as follow:

1. The cardiac end of the stomach is innervated through the pneumogastric nerves, and the right goes direct, whilst the left, by means of a commissural branch of Auerbach's plexus, goes to the stomach.
2. The pneumogastrics send extremely thin fibres to nests of little ganglia of a sympathetic character which are placed about the cardiac end of the stomach.
3. Upon the large branches of the vagi, in the cardiac region, are large nests of ganglia containing many cells.

The separated cardia of the frog can for an hour keep up rhythmic automatic contraction. In living rabbits the cardia is quiet when not irritated.

After death it makes a few rhythmic contractions. By separate induction-breaks to the vagi, the cardia does not contract. With intervals of $\frac{1}{3}''$ in succeeding induction-breaks there ensues weak contraction after a summation-time of $\frac{1}{2}-2''$.

Frequent irritations, from $\frac{1}{12}-\frac{1}{30}''$ interval, of considerable intensity, contract the cardia; by smaller intensity there is a dilatation of the cardia. He also found a nerve whose function it was to dilate the cardia, and also constrictor nerves of the cardia. In the vagus exciting and inhibiting fibres run to the cardia.—*Centralblatt*, No. 31, 1883.

The Action of Irritation of Sensory Nerves upon the Vaso-motor Apparatus in Man.—Dr. Istamanow has made a number of operations upon this subject.

Miss Marie Manassein found that tickling caused a strong reaction in the vaso-motor system. Istamanow studied the changes by means of Mosso's plethismograph, and the temperature variations by means of Meissner-Meyerstein's galvanometer. Tickling caused a diminution of volume in the extremities. After stopping the irritation the volume returned to normal. The surface-temperature also sank, and after the removal of irritation, returned to normal. By blowing on the skin similar results ensued. These results confirm those of Miss Marie Manassein.

Painful irritations caused an increase of volume and an elevation of surface-temperature. When cold was applied to the neck, there was a diminution of the volume of the extremities; the temperature also fell. The application of warm water, 70–90 C., caused an enlargement of the extremities; the temperature was also elevated. All agreeable irritants to the mucous membrane of the nose caused an increase, whilst disagreeable ones caused decrease, in volume.